Claims

We Claim:

1. A method for selecting a mode of operation for at least two modems that communicate via a communications network, the method comprising:
   (a) performing a handshake procedure in order to determine a set of possible modes of operation supported by the modems;
   (b) deriving, from the set of possible modes of operation, a set of favorable modes of operation; and,
   (c) in case there exist two or more favorable modes of operation, performing a probing-based selection that comprises evaluating respective performances of said favorable modes of operation and selecting the favorable mode of operation with the best performance as a resultant mode of operation.

2. The method of claim 1, in which the protocol standards supported by said modems comprise xDSL standards, with at least one of the protocol standards being selected from the group consisting of G.992.1, G.992.2, G.992.3, G.992.4, G.992.5.

3. The method of claim 2, in which one or more of the possible modes of operation are related to particular annexes of said xDSL standards.

4. The method of claim 1, in which said set of favorable modes of operation is derived from said set of possible modes of operation by performing a priority-based selection.

5. The method of claim 4, in which said priority-based selection comprises a first level of priority-based selection, whereby from the possible modes of operation, a first set of favorable modes of operation is selected based on priorities assigned to different classes of upstream tone usage.

6. The method of claim 5, in which said classes of upstream tone usage comprise, in descending order of priority, annex J type, annex B type, and annex A type.

7. The method of claim 5, in which one or more of said different classes of upstream tone usage are excluded from said priority-based selection.

8. The method of claim 5, in which said priority-based selection comprises a second level of priority-based selection, whereby, from the first set of favorable modes of operation, a second set of favorable modes of operation is selected based on priorities assigned to various protocol standards.

9. The method of claim 8, in which said various protocol standards are prioritized in a descending order of priority, at least one of the protocol standards being G.992.5, G.992.4, G.992.3, G.992.1, G.992.2, and non-ITU standards.

10. The method of claim 9, in which substantially the same priority is assigned to the protocol standards G.992.3, G.992.4, and G.992.5.

11. The method of claim 1, in which said probing-based selection comprises initialising said modems to a probing mode of operation.

12. The method of claim 11, in which the probing mode of operation is a diagnostic mode.

13. The method of claim 11, in which said probing-based selection comprises measuring line conditions, in particular the signal to noise ratio, for the probing mode of operation.

14. The method of claim 1, in which said probing-based selection comprises estimating line conditions, in particular the signal to noise ratio.

15. The method of claim 1, in which said probing-based selection comprises determining, for each of the favorable modes of operation, at least one of an upstream bit rate and a downstream bit rate.

16. The method of claim 1, in which said probing-based selection comprises determining, for each of the favorable modes of operation, a performance index indicating the performance of the respective mode of operation.

17. The method of claim 11, in which, for each one of the favorable modes of operation, a performance index indicating the performance of the respective mode of operation is derived from line conditions determined for the probing mode of operation.

18. The method of claim 15, in which for each of the favorable modes of operation, a performance index PI is determined using the following formula:

$$PI = \alpha_d \cdot (DS - DS_{min}) + \alpha_u \cdot (US - US_{min}),$$

in which DS and US denote the downstream and the upstream bit rate, DS_{min} and US_{min} denote the minimum downstream and the minimum upstream bit rate, and in which α_d and α_u denote arbitrary parameters.

19. The method of claim 16, in which the favorable mode of operation with the highest performance index is selected as the resultant mode of operation.

20. The method of claim 16, in which, in case all the performance indices of the favorable modes of operation are equal to a maximum, a secondary performance index is determined and evaluated for each of the favorable modes of operation.

21. The method of claim 11, in which the probing-based selection comprises deciding whether the modems have to be re-initialised before data transmission is started.

22. The method of claim 4, in which said priority-based selection is optionally disabled.

23. The method of claim 1, in which said probing-based selection is optionally disabled.

24. A modem unit adapted for transmitting data via a communications network, said modem unit comprising: a transmission unit adapted for performing a handshake procedure in order to determine a set of possible modes of operation, and for deriving, from said set of possible modes of operation, a set of favorable modes of operation; and a probing facility adapted for performing, where there exist two or more favorable modes of operation, a probing-based selection that comprises evaluating respective performances of said favorable modes of operation, whereby the favorable mode of operation with the best performance is selected as a resultant mode of operation.

25. The modem unit of claim 24, in which the protocol standards supported by said modem unit comprise xDSL standards, said standard selected from the group consisting of at least one of the protocol standards G.992.1, G.992.2, G.992.3, G.992.4, G.992.5.

26. The modem unit of claim 24, in which said modem unit is either a central xDSL modem or a remote xDSL modem.

27. The modem unit of claim 24, said modem unit being adapted for deriving said set of favorable modes of operation from said set of possible modes of operation by performing a priority-based selection.

5   28. The modem unit of claim 27, in which said priority-based selection comprises a first level of priority-based selection, whereby from the possible modes of operation, a first set of favorable modes of operation is selected based on priorities assigned to different classes of upstream tone usage.

10   29. The modem unit of claim 28, in which said priority-based selection comprises a second level of priority-based selection, whereby, from the first set of favorable modes of operation, a second set of favorable modes of operation is selected based on priorities assigned to various protocol standards.

15   30. The modem unit of claim 24, in which said probing facility is adapted for initialising the modem unit to a probing mode of operation.

31. The modem unit of claim 24, in which said probing facility is adapted for one of measuring or estimating line conditions, in particular the signal to noise ratio.

20

32. The modem unit of claim 24, in which said probing facility is adapted for determining, for each of the favorable modes of operation, a performance index indicating the performance of the respective mode of operation.

25   33. The modem unit of claim 24, in which said probing facility is adapted for selecting the favorable mode of operation with the highest performance index as the resultant mode of operation.

34. The modem unit of claim 24, in which said probing facility is adapted for deciding
30   whether the modems have to be re-initialised before data transmission is started.

35. A program stored on a data carrier, capable of executing the method of any of claims 1 to 23.

35   36. A computer comprising the program of claim 35.